IDRC - Lib. 10772

The Pan Asian Networking Project:
A Survey of Communications Activities

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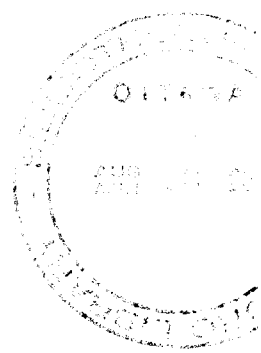

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Acknowledgments

I want to extend a special thanks to all PAN partners (see Appendix 1) who replied to the survey and were generous with their time and ideas during the Mongolia conference. Without their cooperation and interest, this study would have been impossible. Mr Stephen Salewicz made an important contribution to this research. He provided much valuable and welcome help in designing the email questionnaire and the interview guide and in reviewing the data that were collected.

Contents

Executive Summary

This study of the Pan Asian Networking (PAN) project was designed to: understand how information and communication technologies (ICTs) are being used within the PAN network; and test the usefulness of an ICT Audit Framework for mapping and describing these uses.

The mission of PAN is to establish efficient communication and networking among developing-country research and development institutions, NGOs, and development workers to support their efforts to solve development problems. The overall objective of PAN is to determine how researchers, development workers, and decision-makers in developing countries can best use, develop, and adapt networking technologies to improve communication, their access to information, and the impact of the research they conduct to solve development problems — social, economic, cultural, political, educational, or environmental.

The ICT Audit Framework used in this study was designed by Sam Lanfranco to help understand the areas in which ICTs influence the behaviour of projects and the achievement of project objectives. It is designed to provide a framework for thinking about ICTs in projects and about ICT projects and programs, and it can be used to help design an evaluation framework.

Two instruments were developed to collect data for this study. The first was a questionnaire that was administered by electronic mail (email) to determine how ICTs were being used within a sample of the PAN organizations. The second was an interview guide that was used during a PAN conference in Mongolia to clarify information collected during the email survey and to gather additional input into the complete communication environment in which the PAN participants worked. The major findings of the study are grouped below for easy reference.

Uses of ICTs

- All of the organizations have electronic mail and 87% have World Wide Web (WWW) access although their ease and quality of access varies from institution to institution.

- By far the greatest change in the projects was the replacement of regular mail, telephone, and facsimile by electronic mail, which provided a cost-effective, speedy, and easy alternative.
- The ability to communicate with others was rated as being the most important contribution of ICTs, retrieval and distribution of information was ranked second, and collaborative work with colleagues was ranked third.

Contributions of ICTs

- ICTs have contributed "a lot" to work quality. Improvements have resulted from better access to both people and sources of information (databases, CD-ROMS, and WWW pages). This has not only allowed for better focus on information gathering and on dissemination and marketing activities, but has lead to enhanced collaboration and more participatory planning and decision-making.
- Computer usage has improved traditional communication methods. Desktop publishing has enhanced traditional publishing practices by reducing pre-press costs, providing better quality control over design and layout, and saving time. As well, statistical analysis and data presentation have been improved as has the "corporate memory" of organizations that use ICTs to share documents.
- Improvements have been made to marketing efforts and information provision. ICTs have allowed these efforts both to be better focused and more cost effective. As a result, sales of such items as books have increased and information provision for users has been improved.
- Improved collaboration has also produced benefits in project management. Interactions can be more frequent and it is now much easier to share experiences and document processes. ICTs also allow these interactions to be less dependent on time differences and geographic location.
- Users also find data acquisition to be easier and the quality to be improved. By using the Web, more detail is available and the information is more up-to-date. For example, one user remarked that information on developing countries is often lacking in libraries, but there is now much information on the WWW. This improved information flow is reflected in the new opportunities that respondents

reported. Web publishing, making contributions to CD-ROMs and databases, and use of listservs were important new ventures.

Factors Affecting Adoption and Use

- The most common factor in successful adoption of ICTs is the development of a computer culture within the organization. People must be motivated to use the new technologies, must see the benefits first hand, and must be supported and encouraged by their managers.
- Infrastructure problems continue to limit people's ability to take advantage of ICTs. Often this relates to telephone lines — poor quality, low bandwidth, wait time to get a leased line; however, sometimes it is a lack of access to hardware that can run newer software.
- Face-to-face communication remains critical to the work of the people interviewed, not only for day-to-day interactions, but to make such tools as electronic mail more effective.
- Costs continue to be a problem. Although hardware and software costs have been coming down, the time for these items to become obsolete has also shortened. This means significant recurring costs both for purchases and staff training. Because there have been virtually no formal analyses done of the time and cost savings that result from the use of ICTs, some documentation of these costs may be warranted.

Future Plans

- The development of a WWW presence is high on the agendas of many institutions to allow them to disseminate project-related information, advertise the availability of publications and training programs, and develop "web publishing" programs to provide rural communities with development information and links to major centres and to enhance global knowledge about countries and institutions.
- Innovative uses of cellular phone networks and television broadcasts of web pages are being explored as ways to reach rural communities that are beyond the reach

of land-based telephone lines (and therefore computer networks based on regular modems).

- Institutions are interested in the use of electronic conferencing and appreciate the potential benefits, but lack the experience and know-how to undertake such activities.

ICT Audit Framework

- The framework helped focus this investigation of the role of ICTs in PAN and was helpful during the development of the questionnaires and interview guide. However, comments at the conferences in both Mongolia and Toronto suggest that the framework is hard to understand, and this may limit its use. In particular, the definitions of some of the terms may need to be improved.
- The framework is designed to capture the ICT-related inputs to project and program activity; however, the results of this research suggest that it may be useful to consider incorporation of a "traditional communications" component in the framework to ensure that the interactions are drawn out in future analyses. A proposal is made of a modified version of the framework to stimulate further discussion.

Background

This study of the Pan Asian Networking (PAN) project was undertaken as part of a series of joint activities of the Evaluation Unit of International Development Research Centre (IDRC) and of the Bellanet Initiative (a Secretariate housed at IDRC) to examine how Information and Communication Technologies (ICTs) are used within IDRC-supported activities. It was a follow-up to an earlier study (Graham, Michael. 1997. *Use of Information and Communications Technologies in IDRC Projects: Lessons Learned.* Evaluation Unit, Corporate Services Branch, IDRC.)

PAN was selected as the focus for this study following discussions with representatives of Bellanet and of the Evaluation Unit of IDRC and with IDRC program staff responsible for PAN. The network offered several advantages for this study. It included a number of organizations that were involved in complementary and collaborative work, the members were available by electronic mail to make an electronic survey possible, and PAN members were going to be meeting in Mongolia to review program plans, which would provide an opportunity for follow-up interviews and the presentation of results to participants.

This study was designed with the following objectives: to understand how ICTs are currently being used within the PAN network; and to test the usefulness of an ICT Audit Framework for mapping and describing these uses. In addition, the results of the study were to be used to stimulate discussion about the role of ICTs in future PAN activities and to contribute to the discussions at the Global Knowledge 97 Conference in Toronto in June.

In the context of this study, ICTs were considered to be computer-mediated ways of exchanging and sharing information. The most common of these are electronic mail, listservs, computer conferences, and Internet access. Telephone and facsimile, although electronic, were considered to be more "traditional" forms of communications along with face-to-face communications, publications and other written materials, and audio-visual productions.

Pan Asian Networking

The exponential growth in the number of Internet users illustrates how quickly the information revolution, or perhaps more accurately, the networking revolution is spreading. However, the contrast between countries and regions is stark. Some countries are introducing the faster and more powerful Internet II, electronic commerce is changing international trade, and the Internet has become a "consumer product" throughout much of the world.

But, many developing countries have such a poor national telecommunication infrastructure that provision of Internet services based on the telephone networks will be difficult. On a broader level, these countries continue to struggle with policy issues related to the social impact of the Internet on their economy, education, culture, and religion. Researchers, development workers, decision- and policymakers, people, and communities in developing countries face a growing challenge if they are to integrate ICTs into their efforts to address and solve development problems.

In 1994, IDRC commissioned consultations in 10 Asian countries to address this challenge. These studies concluded that there was a need to help increase the networking capacity of the "information poor" and the research and development institutions that serve them. Four related approaches were suggested to facilitate knowledge networking:

- extend access and use of knowledge networking to poor countries, to marginalized men and women, and to research and development organizations;
- build content about development research and knowledge that can be shared electronically, specifically via the Internet;
- initiate and support communication about key development problems and their potential solutions; and
- support applied research on ICT applications and policy reforms.

PAN was designed to respond to these challenges by providing systematic support for electronic networking. PAN opted to centre its activities on the Internet because this technology provides the most efficient platform for connecting individuals and institutions and for facilitating access

to computer-based resources. In Asia, PAN has sought to improve connectivity by supporting the establishment or upgrading of Internet service providers in the information-poor countries of Asia and to develop the networking capacity of key content providers.

The overall objective of PAN is to determine how researchers, development workers, and decision-makers in developing countries can best use, develop, and adapt networking technologies to improve communication, their access to information, and the impact of the research they conduct to solve development problems — social, economic, cultural, political, educational, or environmental. The specific objectives are:

- To determine how the least-developed countries and communities can best achieve sustainable and adequate national and local connectivity, participate in global network resources (Internet), and develop local expertise in computer networking.
- To assist research and development organizations in developing countries to build the capacity and the resource base needed to develop local information materials that can be published on the Internet and other computer media.
- To determine how researchers and development workers can best use Internet technology to help solve local development problems and share knowledge, research results, and community experiences on a global basis.
- To support research on technology adaptation and deployment, policy and regulatory issues, and the social and cultural impacts of the Internet.

PAN focuses on the development of "content" (the packaging of information that is shared by organizations) and on strengthening links among institutions. A significant feature of this activity is the development of content-based subnetworks on issues of priority to the region, such as the environmental, economic, and social dimensions of development. The PAN website provides access to information in the form of full-text documents and multimedia publications and databases. The site now includes information on more than 20 institutions in Asia and is marketed as "the one-stop location where people involved in Asian research and development are networking."

Those who contributed to this study reflect the spectrum of organizations that are participating in development activities in Asia. Included in the survey were representatives from: development agencies, Internet service providers, universities, NGOs, research organizations, publishers, and government regulatory bodies. They share a common goal in seeking to understand how ICTs might be best used to improve the effectiveness of their work, which includes developing policy, disseminating information, gathering information, supporting research, communicating with colleagues and with clients, marketing products and services, and producing print materials.

ICT Audit Framework

This study was conducted with the aid of a framework designed to map or describe the role of information and communication technologies in development projects. This framework was developed by Sam Lanfranco at York University in Toronto, Canada [additional information on the framework can be obtained from Sam Lanfranco (lanfran@bellanet.org) and details about the framework are posted at http://www.yorku.ca/research/dkproj/meta4]. A preliminary study was conducted in March 1997 to look at how ICTs contribute to development projects and to test the applicability of this framework. Further research was undertaken in May and June 1997 to try to understand how ICTs have contributed to the PAN program.

This ICT Audit Framework was designed by Sam Lanfranco to help understand the areas in which ICTs influence the behaviour of projects and the achievement of project objectives. It is designed to provide a framework for thinking about ICTs in projects and about ICT projects and programs, and it can be used to help design an evaluation framework.

The framework is based on the idea that ICTs produce an electronic or virtual workspace that is being used increasingly to overcome some of the constraints imposed by traditional structures and workspaces. Because ICTs can store and process digital information (numbers, text, and audio and video) and also transmit or retrieve this digital information both quickly and at increasingly low cost, new types of organizations and interactions are evolving. The key factor in these interactions is that they allow enhanced collaboration across time and space.

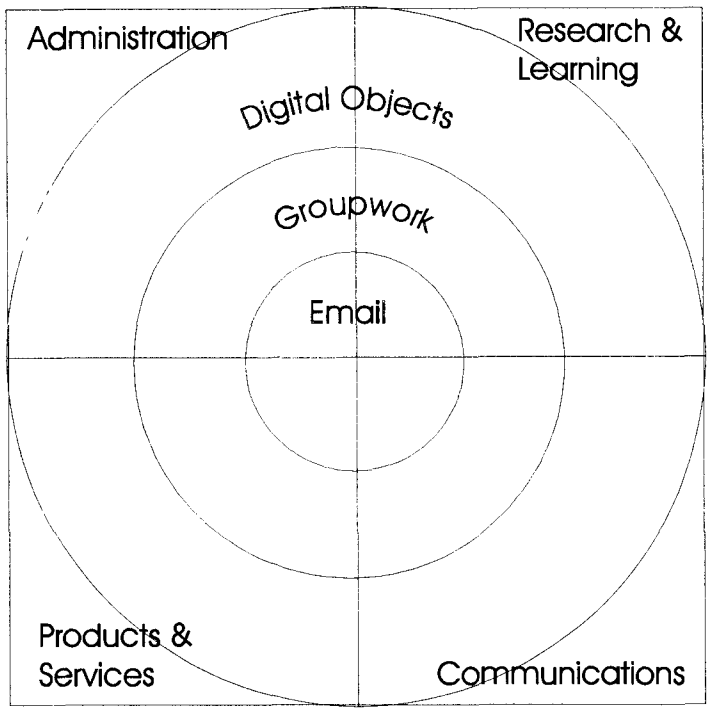

Figure 1. ICT Audit Framework.

In the email survey of PAN partners, this ICT Audit Framework (Figure 1) was used to help develop the questionnaire (Appendix 2). The follow-up interviews were also conducted using a guide that was developed and structured on the basis of the framework (Appendix 3).

The ICT Audit Framework assumes that ICTs operate within and between four quadrants that characterize the activities of any project: administration; research and learning (for internal capacity building); products and services; and communications (within and beyond the entity).

ICTs allow people to undertake activities in each of these four quadrants and are considered to be of three types. Each of these types of ICT activity have comparable activities in the real or "literal" world. First, ICTs facilitate communication. In the framework, email is used to represents the core of a project's electronic workspace. It links the component parts of the project and provides a link to the rest of the world. Traditionally in the workplace, this activity would include such things as conversations and letter writing. Second, ICTs allow us to collaborate across time and space, either within the project or beyond. This workspace, called groupwork, is comparable to the interactions that take place in meetings, seminars, and conferences. Third,

ICTs support the creation, use, and distribution as well as access to stored digital objects (e.g., files, databases, and audio and video objects). This is like a book that is published to convey information and can be consulted as needed to retrieve information.

In the framework, ICTs provide projects with three new capacities: (1) a virtual workspace within the entity (e.g., computers for word-processing and data analysis as well as local-area networks); (2) a communications corridor that allows projects to access remote sites; and (3) a communications corridor to allow remote sites to access products or services produced by the project. These three capacities, the local workspace, local access to remote workspaces, and remote access to local workspaces are the central focus of the framework.

The objective of the framework is to help organize relevant questions and to identify information and evidence. The four-quadrant approach focuses on how the entity operates within its virtual workspace, how its component parts relate to each other in that space, and how the entity relates, as a stakeholder, to other entities within a larger virtual workspace. The framework encourages questions to be asked about the relationship between the project's activities within the electronic venue and in the real world.

Methodology

Questionnaire And Interview Guide

Two instruments were developed to collect data for this study. The first was a questionnaire that was designed to be administered by electronic mail (email). This questionnaire was used to determine how ICTs were currently used within a sample of the PAN organizations that would be present at the conference in Mongolia. ICTs in this context were considered to be computer-mediated communications activities (e.g., electronic mail, listservs, computer conferences, and Internet access). Respondents were asked to provide information on how ICTs helped them accomplish their project work — specifically, how they communicated with others, how they administered their project, how they helped improve project performance, and how they helped in the delivery of products and services. Respondents were also asked to rank the relative importance of three common uses of ICTs in their work — to send and receive information and documents, to collaborate with colleagues, and to retrieve and distribute information. Details on amount of use and examples or types of usage were also collected.

Prior to its use, this questionnaire was pretested by electronic mail on five individuals who use ICTs in their daily work, and a focus group was held to discuss both the format and content of the questions and the suitability of the questionnaire for administration by electronic mail. Following this, the revised questionnaire was tested once more before being sent to a sample of 27 individuals associated with PAN. The sample included service providers, content providers, and IDRC and Bellanet staff associated with the PAN program. After the initial deadline for replies passed, a follow-up reminder was sent by electronic mail to encourage responses.

The interview guide was designed to clarify information collected during the email survey and to help collect information about the complete communication environment in which the PAN participants worked. It was also pretested. During the PAN conference in Mongolia, the guide was used to structure interviews with the people who had completed the email questionnaire. Each interview lasted about one hour.

Sample Group

A total of 27 questionnaires were sent by electronic mail to both PAN participants and to IDRC and Bellanet staff. Of the 20 questionnaires sent to PAN participants, 14 completed questionnaires were received (a response rate of 70%). The response rate from IDRC and Bellanet staff was 2 of 7 (28%). Those who replied to the survey were asked to indicate the multiple roles that they played within PAN. More than half of the replies were from content providers (10) — the other respondents were PAN project managers (6); service providers (4); IDRC staff (2); and others (2). Of the 16 individuals who replied to the survey, 15 participated in the Mongolia conference and all of these people were interviewed (see Appendix 1). Appendix 4 presents the preliminary analysis that was based on the email survey. This paper was presented at the Mongolia conference for discussion and a short presentation based on this material was made as part of a panel discussion at Global Knowledge '97 in Toronto. The balance of this analysis draws on information from both the email survey and the interviews.

Results

The first objective of this study was to understand how ICTs are currently being used within the PAN network. The information collected in both the email survey and the interviews is combined in this analysis. The email survey was designed to look at computer-mediated communications activities of network members; whereas, the interviews were aimed at obtaining a more complete picture of ICT usage for both communications and data processing and of the more traditional communication methods that might enhance or complement ICT usage.

It is important to bear in mind the different meanings that people attached to "communications." One meaning refers to the physical infrastructure, or method, that is used to link organizations or individuals (e.g., electronic mail). The other meaning refers to the process of conveying or delivering information in a way that results in a change in action, behaviour, performance, or knowledge. In this study, communications is used to refer to the "methods" that people use to interact with each other. This would include interactions to discuss issues, share information, and retrieve information. These interactions are facilitated in the "electronic" world by electronic mail and Internet access and by face-to-face meetings, print materials, and audiovisual productions in traditional settings. It does not specifically refer to the social process of communication or seek to measure its effectiveness.

Electronic Environment

Table 1 presents background information on the organizations in which the respondents work. These organizations employ between 5 and 400 staff and a high proportion (80%) have a 1:1 ratio of computers to staff. Priority has been given to establishing external links. All of the organizations have electronic mail and 87% have world wide web (WWW) access although their ease and quality of access varies from institution to institution. The only two organizations without WWW access were located in countries that had either just obtained access within the past few weeks (Papua New Guinea) or did not yet have access (Lao). In contrast, only 5 (33%) had a local-area network (LAN). However, of the 10 organizations that do not yet have LAN connections, eight are in the process of setting up a LAN or are planning to do so.

How ICTs Are Used

Table 2 shows the extent to which the respondents indicated in the email survey that ICTs helped with specific project-related tasks (the quadrants in the framework). In the email survey, respondents indicated that ICTs contributed "a lot" to their communication with colleagues (14 of 15). Developing and delivering products and services (8 of 15), administration (8 of 15), and research and learning (7 of 15) were rated as about equally useful.

In the second part of the email survey, respondents were asked to indicate the relative importance they gave to the different ways in which ICTs can be used (the domains of the framework). An overwhelming majority (13 of 15) ranked the ability to communicate with others (email) as the most important use of ICTs. The ability to retrieve or distribute information (digital objects) as ranked second by 9 of 15, and the ability to collaborate with colleagues (groupwork) through such things as electronic conferences was ranked third by 10 of the 15 respondents.

Access to and provision of digital objects can be expected to grow rapidly. PAN is hosting Web sites for partners who cannot do so themselves, but the discussions in Mongolia make it clear that development of a Web presence is high on the agendas of many institutions. WWW access and posting were a key for 9 of 15 (60%) of the people interviewed. CD-ROMS provided key information for 5 of 15 (33%), and databases access was crucial for 4 of 15 (27%).

Although construction of a Web site is something that is in the future for several institutions, some respondents have been able to improve their access to the electronic world and reported that they had established a WWW presence and were using homepages to disseminate project-related information to their main stakeholders. New products and services are being developed and delivered. ICTs are used to format documents for formal publishing and they are used to seek information and confirm sources. Web pages are also increasingly used to advertise the availability of material (e.g., publications and training programs) and to make information available to a wider audience through "web publishing."

Table 1. The ICT environment within the PAN partner organizations (n = 15).

	Number of organizations
Number of people	
Less than 10	6
11 to 50	6
More than 51	3
Electronic links	
Email	15
WWW	13
LAN	5
Ratio of computers to staff	
1:1	12
Less than 1:1	3

Table 2. Extent to which ICTs were reported in email survey to have helped accomplish various tasks (n = 15).

Communications	Not at all	0
	A little	0
	A lot	**14**
	N/A	1
Administration	Not at all	0
	A little	5
	A lot	**8**
	N/A	2
Research and Learning	Not at all	1
	A little	6
	A lot	**7**
	N/A	1
Products and services	Not at all	1
	A little	4
	A lot	**8**
	N/A	2

There is interest in greater use of electronic conferencing, as well as an appreciation of its potential benefit, but for now its use is limited. Listservs were cited as the most common way for groups to work collaboratively on activities. During the interviews, people said they lacked the know-how to undertake such activities; however, they expressed interest in exploring this form of collaboration. Seven of 15 (47%) said they had never used any form of groupwork. Four (27%) had used listservs, but one of these was disappointed with the services because they were so poorly organized. Only four (20%) used LAN or Intranet services to exchange information internally.

During the interviews in Mongolia, people were asked to talk about their jobs and how they accomplished their work-related responsibilities. Table 4 indicates the mix that was reported between ICTs and traditional forms of communications (e.g., telephone, face-to-face communications, publications, audiovisuals). After they had talked about their jobs, people were asked in the interview what method of communication was "most important" in their work. Five people in these organizations that are well-equipped with ICTs replied face-to-face communication. In comparison, four said that electronic mail was most important, but of these, three added that face-to-face meetings were essential to make email links effective. Other first choices included print and written material (3), telephone and fax (2), and meetings (1).

Human interactions are clearly very important; however, electronic means of communication are becoming increasingly important. For their second choice, eight respondents chose email or WWW, four face-to-face, and three telephone and fax. As their third choice, email or WWW were chosen by eight respondents. All respondents conceded the increasing role that they expected ICTs to play, but print and video were singled out for their importance for future development activities in rural areas. Nonetheless, ICTs can be expected to have increased impact in rural areas. Some PAN partners are exploring innovations such as the use of cellular phone networks and television broadcasts of web pages to reach rural communities at reasonable cost.

Table 4. How those interviewed use different types of communication methods to accomplish their work (n = 15).

	Communication method			
Activity	Traditional*	Email*	Groupwork*	Digital Objects*
Products and Services	30	16	1	16
Administration	20	13	2	3
Research and Learning	5	2	0	0
Communications	0	0	0	0

* Number indicates number of times each form of communications was used to perform a duty under each type of activity

In the interview replies, research and learning was not as often cited as an activity supported by ICTs. The ICT usage that was reported as collaborating, analyzing, and using information in the email survey seems more linked to data collection, analysis, and use to improve product and service development and delivery. The use of ICTs for institutional capacity building and internal knowledge diffusion was reported as being limited. This may change as more projects make use of LANs to provide the physical links between internal users, and it may be an area that PAN may wish to encourage among its members. Because people were asked how they communicate, "communications" as a specific activity was not discussed. Communication is crucial, but in this context is considered to be the catalyst that contributes to the accomplishment of specific tasks (related to products and services, administration, or research and learning).

Factors That Affect ICT Usage

The responses to the email survey reflected the changes that are taking place in the workspace. Respondents were also asked about the benefits they have derived from ICTs. By far the greatest change in the projects was the replacement of regular mail and telephone and facsimile by electronic mail for regular communication. During the interviews, information was sought on the factors that make ICTs a success as well as those things that are currently limiting the use of ICTs. Respondents were also asked if there were disadvantages to ICTs.

Electronic mail was favored by those interviewed because it provided a cost-effective, speedy, and easy way to improve their access to a global community of associates, clients, colleagues, and experts. Speed of communications was a major benefit reported by 9 of 15 (60%) of the people interviewed; 47% cited cost savings; and 33% direct access to the person you want to reach. Other benefits included reliability, lack of intermediaries in the communication, informality, and ease of use.

These uses of electronic mail reflect the growing dependence of the organizations on electronic means to develop and deliver their products and services. ICTs are also used extensively for project administration. Electronic mail is commonly used to help with coordination, planning, monitoring, data collection and analysis, and comparative evaluations. These uses of ICTs allow for timely administration of activities and are viewed as indispensable to those who are using them.

Factors That Contribute To Successful Adoption Of ICTs

The factors that were reported in the interviews to make ICTs a success are listed in Table 5. The most common factor in successful adoption of ICTs is the development of a computer culture within the organization. People must be motivated to use the new technologies, must see the benefits first hand, and must be supported and encouraged by their managers. This said, some respondents are still having some problems convincing management of the need to introduce and apply ICTs in the workplace. In some cases, managers were felt to be taking a "wait and see" approach or were not yet convinced that information was vital to their organization's success. Other respondents felt they were caught in "turf wars" over who would receive new equipment, which frustrated staff and could delay project activities and strain personal relationships. Work is still required to change the attitudes of some managers because supportive managers are very important to future implementation.

Factors That Limit Adoption Of ICTs

Infrastructure problems continue to limit people's ability to take advantage of ICTs (Table 6). Often this relates to telephone lines — poor quality, low bandwidth, wait time to get a leased

Table 5. Factors that contribute to the successful adoption of ICTs.

Factor	Number of times mentioned
Computer culture, motivate staff to use, change attitudes	9
Training	8
Cost savings	4
Availability of equipment	4
Speed and reliability of connections	3
Technical backstopping	2
Local content	1

Table 6. Factors that limit the adoption of ICTs.

Factor	Number of times mentioned
Infrastructure	7
People/training	5
Management factors	4
Costs	3
Localization of software	1

line; however, sometimes it is a lack of access to hardware that can run newer software (e.g., Windows 95 programs). To address the need to overcome problems related to poor phone lines, some of the respondents are seeking alternatives via cellular technologies and innovative uses of television broadcast signals. Staff with appropriate training are difficult to find and retain, and in other situations, existing staff require training but local training facilities are lacking or are of poor quality. This need for appropriate staff and training programs is most felt for web-page design and LAN administration.

Costs, too, continue to be a problem. Although hardware and software costs have been coming down, the time for these items to become obsolete has also shortened. This means significant recurring costs both for purchases and staff training. Staying current can drain resources and may

not produce economic benefits in the short-term. This makes justification of expenditures crucial for planning.

Other constraints that may be important were also mentioned. There is little "localization" of software (which is generally only available in English) and therefore the barriers to personal use remain high (both in terms of money and English skills) and this may limit broad adoption in some countries. Also to be addressed are concerns related to secure fund transfers at reasonable cost, improvements in local content, and enhanced connectivity in countries where access is currently restricted.

Disadvantages Of ICTs

Limited disadvantages were reported for the use of ICTs. Costs and drains on resources are a concern. But, although financial issues are seen as a constraint, the investment is considered to be worthwhile. There is also a concern over the strong dependence that is developed on the technologies. This dependency can mean that when computer systems are down all office work comes to a halt. As well, some people feared the lack of human contact and the potential for people to waste time "surfing" the net and "fiddling" with computers. Other disadvantages were related to the volume of electronic mail that arrives daily, the lack of control over messages on listservs, and the expectation that electronic-mail messages would be replied to immediately and elicit immediate action.

Impact Of ICTs On Quality And Productivity

During the interviews, questions were asked to try to determine the impact that ICTs have had on both quality and overall productivity. Thirteen of 15 respondents said that ICTs had contributed "a lot" to the quality of their work. The other two felt it was premature to say, but fully anticipated improvements.

Quality improvements resulted from improved access to both people and sources of information (databases, CD-ROMS, and WWW pages). This has not only allowed for better focus on information gathering and dissemination and marketing activities, but has lead to enhanced collaboration and more participatory planning and decision-making.

Computer usage has also improved traditional communication methods. Desktop publishing has enhanced traditional publishing practices by reducing pre-press costs, providing better quality control over design and layout, and saving time. As well, statistical analysis and data presentation have been improved as has the "corporate memory" of organizations that use ICTs to share documents.

Respondents were also pleased with the contributions made by ICTs to overall productivity. Ten of 15 felt productivity had increased "a lot", three "a little", and two were not sure. Speed was the main determining factor — literature searches could be done more quickly, desktop publishing speeded up publication production, data analysis was quicker, listservs allowed simultaneous contact with many users, and correspondence was speedier.

However, other measures of productivity were suggested. New opportunities have been presented and more things can now be done that were impossible before. Construction of web pages for information dissemination and marketing are possible and some organizations now have the ability to publish additional titles with the same resources. Productivity has also been improved because the larger number of interactions lead to more effective collaboration and more participatory decision-making. These interactions can now be done more rapidly and become much more practical irrespective of where the people are in the world.

Cost And Time Savings

Respondents were also asked to assess the impact of ICTs on operating costs and time savings. Changes in costs are variable. Five of 15 reported a decrease, three felt costs had increased, three felt they were the same, and three were unsure of the impact. Those who felt costs had decreased pointed to reductions in communication costs (mail, telephone, and fax) and reductions in staff that exceeded increases in costs for hardware and electronic access. Those who felt costs had increased pointed to hardware costs, staff costs, connection and access costs, and software costs. However, they felt these investments would produce future dividends. Those who were unsure of the costs or felt that costs were about the same, were unable to balance increases in communications costs with savings elsewhere.

In terms of time, 11 of 15 felt that ICTs contributed to time savings. One saw things as remaining about the same, and three were unsure — partly because they had never been without ICTs. Time savings were reported primarily for communications and for data and information searches. Respondents also pointed to the ability to do more work with the same number of people or to do the same work with fewer people. Two people felt that individual transactions were quicker, but that the overall amount of time on activities was about the same. This could lead to better quality but not necessarily faster turn-around time. As well, because of the increases in the volume of messages, more time has to be spent to read and reply to incoming electronic mail.

It is interesting to note that there have been virtually no formal time or cost analyses done. The participants had "gut feelings" about cost and time savings, but no concrete evidence. Given the continuing need to convince managers of the benefits of investing in ICTs in some organizations, such record keeping might be warranted. In all cases, knowing the balance between investments and returns would be a useful input to business plans and to corporate or organizational planning.

New Opportunities

The final portion of the interview dealt with the new opportunities that had been presented by the ICTs and plans for the future. ICTs have allowed people to do new things and to do things differently.

Improvements have been made to marketing efforts and information provision. ICTs have allowed these efforts both to be better focused and more cost effective. As a result, sales of such items as books have increased and information provision for users has been improved. Associated benefits include better networking and the ability to maintain contacts and to follow up with key collaborators and clients because of improved communication methods.

Improved collaboration has also produced benefits in project management. Interactions can be more frequent and it is now much easier to share experiences and document processes. ICTs also allow these interactions to be less dependent on time differences and geographic location.

Users also find data acquisition to be easier and the quality to be improved. By using the Web, more detail is available and the information is more up-to-date. For example, one user remarked that information on developing countries is often lacking in libraries, but there is now much information on the WWW. This improved information flow is reflected in the new opportunities that respondents reported. Web publishing, making contributions to CD-ROMs and databases, and use of listservs were important new ventures. Some of this activity was independent, much of it had been encouraged because PAN was able to host web pages until local capabilities were improved. These efforts not only assist information users but offer good opportunities for the creation of local content that may help encourage better usage of local services. The need to encourage local content on the Internet was discussed during the Mongolia conference and was endorsed as being important.

In three cases, ICTs were the reason for the existence of the organization. In these cases, new opportunities were being created to apply ICTs and for staff to learn on an on-going basis. Desktop publishing was new to three organizations and was providing opportunities to enhance quality control, to undertake new activities to reach a broader range of users, and to increase production. But, PAN partners are not limiting their activities. One member told me that plans for a print journal may now be set aside in favour of an electronic version published on the web.

Future prospects appear bright for these PAN partners. All see a future in which ICTs will change the way they work. Seven of 15 foresee major increases in their use of the WWW in the next 2 years — up to as much as half of their work. Web usage is seen to be crucial both to gather information from elsewhere and to disseminate information — to market products, provide rural communities with development information and links to major centres, and to enhance and make more reliable global knowledge about countries and institutions. This concern with both access to remote sites and encouraging access from remote locations fits well within the concepts of the communications quadrant in the framework. Those people interviewed take very seriously what Sam Lanfranco has called their "obligation to inform." Not only do they feel an obligation, they are most anxious to make use of ICTs to enhance their activities within the products and services sector of their organizations.

Opportunities for internal enhancements are also on the horizon. Over the next 2 years, seven of 15 foresee usage of LANs, Intranets, virtual conferences, and listservs to better link staff and clients or users. This is expected to help make activities more participatory, reduce duplication, and enhance sharing of data. These improved links will accrue to organizations (for example libraries and information centres) and to individual researchers. Commercial activity using the WWW is also anticipated to increase in the next 2 years.

When asked to say where they expect to expand their use of ICTs, creation of a web presence to disseminate and collect information was most often mentioned (13 of 15). The other two people placed emphasis on computerizing library services and electronic filing of documents. Over the next 2 years, users expect to enhance web sales, establish their own web sites and listservs, promote publications and activities on the web, use information from the web for decision-support and for empowerment, enhance distance education via cellular communication and broadcast of web pages via televison signals, contribute to databases on the web to provide more complete and accurate information about organizations and countries (especially for countries such as Papua New Guinea and Lao that are only now getting or expected to get access), and gather information from external sources to improve their own research and policy development.

Conclusion

The conclusions that can be drawn from this study have been divided into two parts — those that relate to PAN and how it might wish to look at future activities and those that relate to the use of the ICT Audit Framework.

PAN

This study provided an opportunity for PAN partners to get an overview of their current and future uses of ICTs. The use of a framework to structure the evaluation activity generated interest in the framework for future PAN activities, and it was recommended that the framework and the results from the study be posted to the PAN web site to allow for further discussion of how the framework might be used to map ICT activities and structure future evaluations. As well, after my presentation in Mongolia, interest was expressed in using the framework for an upcoming study in Nepal. Plans have also been made to host a virtual conference about ICT evaluation on the PAN website.

The email survey seemed to present an accurate picture of the current usage of ICTs in PAN for communications-related activities. The pictorial representation that was developed to indicate usage proved to be effective (Figure 2) in conveying the broad findings of the survey. Participants were able to see at a glance that as a whole the network was making limited use of group work. This point came up in discussions several times and may have helped focus discussions about future PAN priorities. The interviews also provided an opportunity for participants to talk about their experiences and forced them to think about their ICT and non-ICT activities in a structured way. Some differences are apparent in the interpretation of the information from the email survey and the interviews (see Tables 2 and 4). In the email survey, we asked specifically about the four quadrants of the framework. Therefore, the replies were channeled in this way. By so doing, "communications" was ranked very strongly and the other three quadrants (administration, research and learning, and products and services) were rated about equally. During the interviews, people were instead asked about their jobs and to say what methods of communication were most important to the accomplishment of their tasks. In this

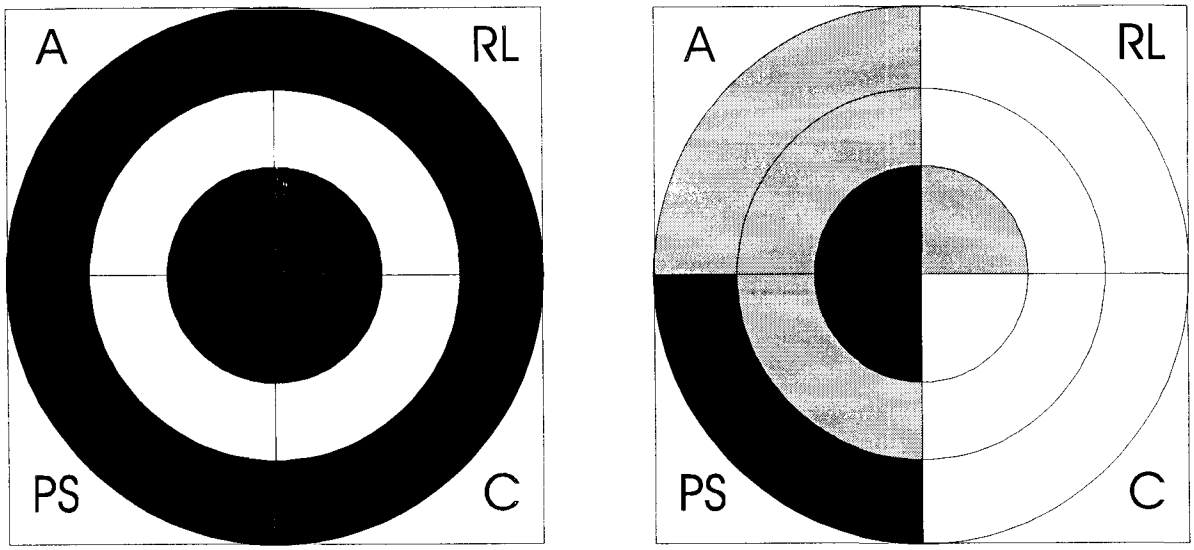

Figure 2. Results of the email survey and interviews plotted using the ICT Audit Framework. On the left is information gathered from the email survey. On the right is the interpretation of data from the interviews.

C = communication; PS = products and services; RL = research and learning; and A = administration. Centre circle represents email, second group work, and outside circle digital objects. White areas represent little or no usage; light gray represent little usage, dark gray represents moderate usage; and black represents heavy usage.

way, communication per se was not discussed, rather it was the use of communication tools — for administration, research and learning, and products and services — that was discussed. Figure 2 compares the results as they might be interpreted by using each of the two methods used to collect data. The differences may suggest the need for modifications to the framework (see later).

PAN can learn a few things from this work. It is important that ways are sought to encourage more collaborative work if the full impact of ICTs is to be realized. It is also clear that partners are very anxious to continue to expand their presence on the WWW. PAN should continue to encourage and support these activities in future. In this regard, training in two areas appears to be important: web-page production and LAN setup and administration. These should likely be the focus for future PAN training activities.

Another thing that PAN might wish to explore is ways to encourage some organizations and mangers to support investments in ICT usage. Participants reported some difficulties in getting mangers to support their plans and PAN may be able to assist by supplying information that would support their arguments. One thing that might assist would be to collect evidence of the actual cost and time savings that can be realized from ICT investments. It appears that most people involved with ICTs are convinced of these benefits, but the evidence may need to be collected in a form that can be used by partners. Given the investments that are required in hardware and software and in staff training, it is reasonable for managers to ask for hard evidence that these investments will pay off in savings or enhanced performance.

ICT Audit Framework

The framework provides a useful focus to the investigation of the role of ICTs in programs and projects. It was used successfully in two studies to help structure thinking about ICTs and also to develop questionnaires and an interview guide. However, comments at the conferences in both Mongolia and Toronto suggest that the framework is hard to understand, and this may limit its use. Nonetheless, interest was expressed in Nepal to further study the framework for future use, and participants in Mongolia recommended that it be posted to the PAN web site and that evaluation become a part of PAN activities. The framework was seen by the participants to be a useful way to guide thinking about the use of ICTs within PAN. Perhaps thought could be given to preparing a simplified and shortened version of the framework that could be used for a rapid mapping of ICT capabilities in a field situation and to guide thinking about potential applications of ICTs in projects and programs.

Some of the results that were obtained suggest that the questions we formulated were not clear enough. This could be because the questions themselves were ambiguous or perhaps we failed to completely understand the framework early on in the process of designing the email survey. Several people suggested that the "definitions of terms" needed improvement. In particular, "digital objects" was not well understood. As a result, a switch was made to "digital media" during the interviews and this term seemed to be more understandable. Email was well understood, but perhaps it conveys too narrow an idea and restricts thinking about activities in this domain.

Based on the results from the interviews, which were designed to complement the email survey by asking questions about the entire communications environment, it may be useful to incorporate "traditional communications" in the framework given the strong links that were found to exist between the traditional and ICT usages. Without this component, some valuable information about the factors that affect ICT usage might be lost.

The results of this study suggest that it may be useful to question the use of "communications" as a quadrant in the framework. The use of communications may tend to place too much emphasis on the communication aspects of ICT inputs. Communications is clearly a key benefit delivered by ICTs, but people see it as a tool to use to improve other aspects of their work (most often, administration and products and services). The communications quadrant helps focus attention on remote-to-local and local-to-remote access. But, these two capacities are part of email and groupwork almost by definition because these activities are two-way in nature. As well, during the development of the email survey and questionnaire, the virtual workspace (such uses as word processing and data analysis) was likely given less emphasis than it should have received. We tended to get caught up in the "communication aspects" and replies and thinking may be limited to the physical links rather than to the "uses" of the tools to accomplish specific tasks.

The strong emphasis placed on traditional communications by the people who were interviewed, and the close links of these non-ICT to ICTs suggests the need to account for these traditional communication methods in the framework — perhaps either by calling the communications quadrant "Traditional Communications" or by adding a fourth domain. The strong focus on the new capabilities that are provided by ICTs may lead some people to pay less attention to the other uses of ICTs — for example in data analysis, data presentation, or desktop publishing. (Although the framework includes these in communication quadrant.) These are recognized as important and complementary uses of ICTs to traditional publishing and research activities and are likely the first uses of computers in most organizations. It is important to ensure that these

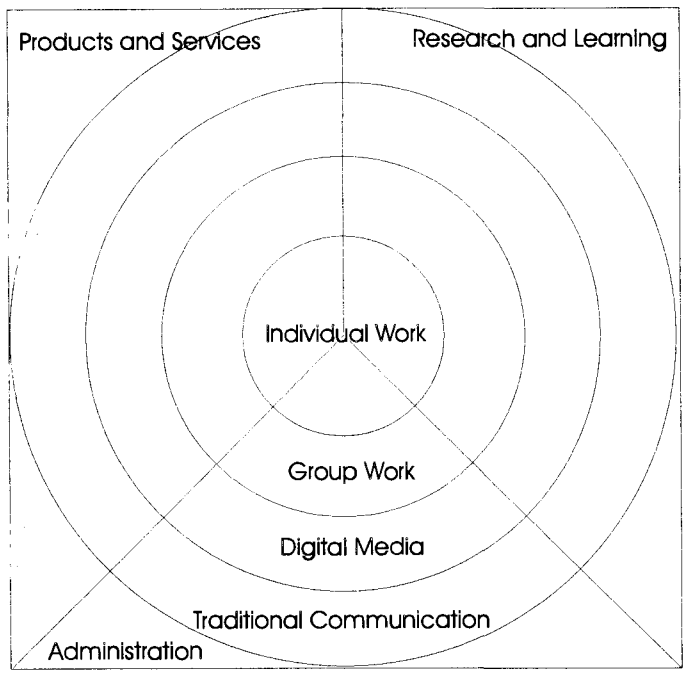

Figure 3. Modified version of ICT Audit Framework for discussion. See text for explanation.

uses are not left out when the framework is applied. Because the communications (or linking) aspects are "newer" there may be a tendency to overlook such uses as desktop publishing and data analysis.

In this study, it was only during the interviews did these non-communication aspects of ICT usage came forward. This may reflect a lapse in the design of the research instruments or a limited understanding of how to apply the framework. But, it may also point to a need to ensure that the framework guides users in this direction. A name change of the "email" domain to something such as "individual work" might help in this regard.

Figure 3 presents a modified version of the framework to stimulate further discussion. In this case, traditional communications has been added as a fourth domain. One other option might be to change the "communications" quadrant to "traditional communications." As well, email has been renamed as "individual work" and digital objects as "digital media."

In conclusion, the framework is a useful tool to focus thinking about ICTs, and it can be expected to generate further comment and input in the coming months as it is posted to the PAN web site, used in Nepal, and perhaps used in other projects such as the APC Women's Network to inform evaluation exercises.

Appendix 1: Sample Group

Mr Chin Saik Yoon, Publisher, Southbound Sdn Bhd, Malaysia

Mr Gilles Cliche, Senior Program Specialist, International Development Research Centre, Canada

Dr Dangaasurengiin Enkhbat, Director General, Datacom Co., Ltd., Mongolia

Dr John Evans, Development Manager, University of Papua New Guinea Press, Papua New Guinea

Dr N K Gopalakrishnan, Senior Faculty and Librarian, Administrative Staff College of India, India

Mr Selim Reza Hasan, Program Officer, Community Development Library (CDL), Bangladesh

Mr Kenneth C Ilarde, Research Assistant, MIMAP (Philippines Policy and Development Foundation Inc.), Philippines

Dr Yusuf M Islam, Program Advisor, Computer Services Unit, Grameen Trust, Grameen Bank Bhaban, Bangladesh

Mr M Shamsul Islam Khan, Head, Dissemination and Information Services Centre, International Centre for Diarrhoeal Disease Research, Bangladesh

Mr Renald Lafond, Senior Program Specialist, Team Leader - Pan Networking, International Development Research Centre, Canada

Mr Jamshed Masood, Divisional Engineer, Pakistan Telecommunication Authority, Pakistan

Mr Muhartoyo, Documentalist, Asian and Pacific Coconut Community (APCC), Indonesia

Mr Romeo Danie B Pedragosa, Information Network Manager, Approtech Asia, Philippines

Mr Pho Muangnalad, Director, Department of Development and Promotion Technology, Science, Technology and Environment Organization (STENO), Lao PDR

Mr Koy Kim Sea, Under-Secretary of State, Ministry of Posts & Telecommunications, Cambodia *(unable to attend conference)*

Ms Leelangi Wanasundera, Head, Information and Communication Division, Centre on Integrated Rural Development for Asia and the Pacific (CIRDAP), Bangladesh

Appendix 2. Questionnaire For Email Survey

Dear
As part of the preparation for the PAN conference in Mongolia in June, I have been asked by IDRC to gather some preliminary information on how information and communications technologies (ICTs) are currently being used by PAN members. Findings from this study will be presented during one of the conference sessions in Mongolia and will help plan future activities within PAN. This brief questionnaire should take approximately 15 minutes to complete. Please return the completed questionnaire to Michael Graham (mgraham@achilles.net) by 19 May.

Thank you for your assistance.

INTRODUCTION

Within the PAN family of projects, information and communication technologies (ICTs) are being used to connect individuals and institutions for knowledge sharing across Asia. Broadly speaking, PAN promotes collaboration in research and development by using ICTs to facilitate information access, use, and exchange. More specifically, ICTs are used within PAN projects for three functions:

* to transmit or receive information via e-mail;
* to collaborate with colleagues by electronic conferences on such joint activities as the development of projects and the preparation of reports and publications; and
* to retrieve or distribute digital information (e.g., CD-ROMs, images, data bases, Geographic Information Systems, and World Wide Web pages).

To ensure successful implementation of their projects, organizations, and the individuals who work within these organizations, tend to engage in four sets of activities:

* communicate with others (within and beyond their organization);
* administer projects (e.g., planning and financial control);
* collect, analyze, and use information to improve project performance (e.g., monitor, evaluate, and report on project activities, and develop new work processes); and
* develop and deliver products and services (e.g., a research institution may seek to develop new research methodologies or technologies and deliver these products to policymakers, other researchers, or members of the public; an NGO may develop and deliver a service such as a community health project; and a publisher may develop and promote a new series of development titles).

These are the activities we would like to explore in the following questionnaire:

QUESTIONNAIRE

Please place an "x" within the () to indicate your answer.

1) Although you may use ICTs in various roles, please indicate in what capacity within PAN you are answering these questions. If appropriate, please check more than one box (e.g., if you are a project manager within a service provider, check both service provider and project manager):
() service provider
() content provider
() project manager
() IDRC staff (program manager)
() other (please specify)

2a) Please indicate the extent to which ICTs have helped you to:

Communicate with others
()not at all ()a little ()a lot

Administer your project
()not at all ()a little ()a lot

Collect, analyze, and/or use information to improve project performance
()not at all ()a little ()a lot

Develop and deliver products and services
()not at all ()a little ()a lot

2b) If you answered "not at all" to any of the choices, please give an example how, in the absence of ICTs, you did accomplish your work in these areas:

-Communicating with others:
-Administering your project:
-Collecting, analyzing, and/or using information to improve project performance:
-Developing and delivering products and services:

2c) If you answered "a little" or "a lot" to any of the choices, please give an example of the specific tasks that ICTs helped you with in your work:

-Communicating with others:
-Administering your project:
-Collecting, analyzing, and/or using information to improve project performance:
-Developing and delivering products and services:

3) Looking at the following possible uses of ICTs, please rank them in their order of importance to your organization (to rank please type 1, 2, or 3, with 1 being most important).

() To send or receive information and documents to and from other people (e.g., e-mail)
() To collaborate with colleagues (e.g., electronic conferences)
() To retrieve or distribute information (e.g., World Wide Web)

COMMENTS (Please provide additional information that you feel would help us better understand your answers):

As noted in the introduction to the questionnaire, ICTs can serve three specific functions within an organization:
* to transmit or receive information via e-mail;
* to collaborate with colleagues by electronic conferences; and
* to retrieve or distribute digital information.

The following questions are included here to track the extent to which these ICT functions have helped you and your organization undertake various types of activity.

4a) E-MAIL: Please indicate the extent to which E-mail, has helped you to:

Communicate with others
()not at all ()a little ()a lot

Administer your project
()not at all ()a little ()a lot

Collect, analyze, and/or use information to improve project performance
()not at all ()a little ()a lot

Develop and deliver products and services
()not at all ()a little ()a lot

COMMENTS (Please provide additional information that you feel would help us better understand your answers):

4b) ELECTRONIC CONFERENCING: Please indicate the extent to which electronic conferencing has helped you to:

Communicate with others
()not at all ()a little ()a lot

Administer your project
()not at all ()a little ()a lot

Collect, analyze, and/or use information to improve project performance

()not at all ()a little ()a lot

Develop and deliver products and services
()not at all ()a little ()a lot

COMMENTS (Please provide additional information that you feel would help us better understand your answers):

4c) DIGITAL INFORMATION: Please indicate the extent to which producing or using digital information, such as data bases, images, Geographic Information Services, and CD-ROMs, has helped you to:

<<Please note that the World Wide Web is discussed in questions 4d and 4e.>>

Communicate with others
()not at all ()a little ()a lot

Administer your project
()not at all ()a little ()a lot

Collect, analyze, and/or use information to improve project performance
()not at all ()a little ()a lot

Develop and deliver products and services
()not at all ()a little ()a lot

COMMENTS (Please provide additional information that you feel would help us better understand your answers):

4d) WEB SITE: Please indicate the extent to which the ability to retrieve documents or files from a web site has helped you to:

Communicate with others
()not at all ()a little ()a lot

Administer your project
()not at all ()a little ()a lot

Collect, analyze, and/or use information to improve project performance
()not at all ()a little ()a lot

Develop and deliver products and services
()not at all ()a little ()a lot

Do not have direct access to the World Wide Web from my institution ()

COMMENTS (Please provide additional information that you feel would help us better understand your answers):

4e) WEB SITE: Please indicate the extent to which the ability to make your documents and files available on a web site has helped you to:

Communicate with others
()not at all ()a little ()a lot

Administer your project
()not at all ()a little ()a lot

Collect, analyze, and/or use information to improve project performance
()not at all ()a little ()a lot

Develop and deliver products and services
()not at all ()a little ()a lot

Do not have direct access to the World Wide Web from my institution ()

COMMENTS (Please provide additional information that you feel would help us better understand your answers):

THANK YOU VERY MUCH FOR YOUR ASSISTANCE.

I LOOK FORWARD TO MEETING YOU AT THE CONFERENCE IN MONGOLIA AND TO DISCUSSING MY FINDINGS WITH YOU.

Michael Graham

Appendix 3: Interview Guide

NAME:

ORGANIZATION:

JOB TITLE:

Begin by asking interviewee for clarification, as required, regarding answers/comments offered in the survey questionnaire.

Did you encounter any technical difficulties either in receiving the email questionnaire or in replying? Are there ways that we could have improved the design of the questionnaire?

1) *How large is your organization —number of people, number of computers?*

2) *Are the people you work with in your organization linked electronically in some way (e.g., LAN or Intranet)? If so is this useful? For what?*

3) *Do you have external electronic links? If yes what kind do you have (e.g., e-mail, WWW)? If so is this useful? For what?*

4) *I am interested in understanding what you do and how you use both computer-based communications and more traditional communications tools to do these things.*
   - *What are the three most important things you do in your job?*

   Duty 1: *Duty 2:* *Duty 3:*

   - *To (duty 1) what are the three main things (activities) you need to do?*
   - *When you do these things, how do you communicate with others (colleagues, stakeholders, clients, collaborators) and gather information? (ICT and non-ICT)*

Duty 1:

Activity 1:

Methods of communication:

Activity 2:

Methods of communication:

Activity 3:

Methods of communication:

Duty 2:

Activity 1:

Methods of communication:

Activity 2:

Methods of communication:

Activity 3:

Methods of communication:

Duty 3:

Activity 1:

Methods of communication:

Activity 2:

Methods of communication:

Activity 3:

Methods of communication:

Importance - what methods of communication are most important to you?

5) *Of all the ways you communicate with others and gather information, which would you rank as the most important to your work. Which is second most important, and so on.*

Most important:
Second:
Third:
Fourth:
Fifth:

Assessment

6) *As we have discussed, you communicate and gather information using a range of computer-based information technologies and more conventional forms, such as face-to-face conversations, seminars, and reference books and manuals.*

A) Based on your own experience, what does the electronic transmission of information (email, or perhaps numerical, textual, audio, or video objects) give you and your organization that you didn't have before? (Try to move the discussion between each of the four quadrants.)

Comments:

B) Based on your own experience, what does the ability to work collaboratively using computer-based technologies (Intranet, Internet, listservs, computer conferences, etc) give you and your organization that you did not have before? (Try to move the discussion between each of the four quadrants.)

Comments:

C) Based on your own experience, what does access to such things as external databases, CD-ROMS, GIS information, and WWW sites give you and your organization that you did not have before? (Try to move the discussion between each of the four quadrants.)

Comments:

7) *Based on your experience with computer-based technologies, what factors do you think are the most important in making ICTs a success?*

Comments:

8) *Based on your own experience, are there factors that have limited your ability to take advantage of computer-based technologies?*

Comments:

9) *How much do you think computer-based information technologies have contributed to the* ***quality*** *of your work?*

□ a lot
□ a little
□ none
□ negative effect

Comments: (How have they had this effect on quality?)

10) *How much do you think computer-based information technologies have contributed to the **quantity** of work you produce?*

□ a lot
□ a little
□ none
□ negative effect

Comments: (How have they had this effect on your productivity?)

11) *A) Have computer-based information technologies changed your organizations' operating costs or how you use your time (time savings)?*

Costs:	Time:	Opportunities:
□ Increased	□ Increased	□ Increased
□ Decreased	□ Decreased	□ Decreased
□ No change	□ No change	□ No change

Comments:
Costs:

Time:

B) Have you actually documented the change in the amount of time or money, or is this just a "feeling" that you have? If you have documented these changes, how much change has there been?

11) *Have computer-based technologies created new opportunities for you and your organization — either to do new things or to do things differently?*

Opportunities:
□ Increased
□ Decreased
□ No change

Comments:

12) *Based on your experiences, do you think that there are any disadvantages to using computer-based information and communication technologies? Explain.*

Comments:

Future Use

13) *In 2 years what changes do you foresee in how you and your organization will use computer-based information technologies to do your work?*

14) *In what area(s) of your work do you expect to or want to expand the use of computer-based information technologies? Which of these areas will be the most important for your work?*

15) *What changes need to occur for your plans and hopes to be realized?*

16) *Thank you very much for your time both to fill out the email survey and to meet with me here. Are there any other comments you would like to add?*

Appendix 4: Mongolia Presentation

ICT-Related Activities in PAN: An Email Survey

Michael Graham

This paper reports on the results of a survey that was undertaken to: understand how information and communication technologies (ICTs) are used within PAN; and test an ICT Audit Framework that was developed by Sam Lanfranco to help understand how ICTs affect project behaviour and influence the achievement of project objectives. The paper talks about how evaluations are increasingly used by organizations to contribute to management and planning functions. It also summarizes the framework that was used to map the use of ICTs in PAN. Finally, it reports on the results from a survey of members of the PAN network that was conducted by email for this conference. The overall objective of the paper is to stimulate discussion about how ICTs can be used and to gather feedback on whether the Audit Framework is a useful way to view the contributions of ICTs to project and program activities.

As we approach the end of the decade, there has been a change in the way that many organizations use evaluation. Budgets have continued to shrink, and demands to demonstrate that parties involved in programs and projects are "getting their money's worth" continue to grow. Our perspectives on development have become more holistic and multi-disciplinary, leading to the involvement of more partners and stakeholders in development programs and projects. Participatory approaches are gaining ground and many developing country institutions are no longer finding it acceptable to have external evaluations imposed on them. They too are beginning to recognize the direct benefits of conducting their own evaluation activity.

As a result, evaluation is shifting away from its traditional role as a control mechanism to a tool that can **empower organizations and contribute to organizational learning**. Globally, evaluation is now seen increasingly as a tool that helps organizations to improve the quality of their work, communicate with key stakeholders, and learn lessons for future activities.

As evaluation has become more closely linked to ongoing learning and improvement, we talk about evaluation and monitoring as being linked processes for collecting, verifying, and using information to help inform management decisions. When these activities are built into the program or project from the start, they provide the "sensory system" that can be used to make on-going improvements, better decisions and set benchmarks for the future. In summary, monitoring and evaluation have three purposes: (1) to **improve performance** by contributing to a better understanding of project performance and ultimately to more effective programs; (2) to document **lessons learned** and to integrate the learning into the planning process; and (3) to **enhance accountability** by demonstrating how resources are used and with what results.

The complexity of today's development activities makes it important to have a framework to guide data collection and analysis. A framework explains the main dimensions under study and outlines their presumed relationships. In response to the current interest in the bourgeoning use of information and communications technologies in development activities, IDRC and Bellanet have developed and are testing an ICT Audit Framework. It was designed specifically to help guide assessments of how ICTs are affecting the development organizations work. The results of this work are presented below. During discussions of these findings, I hope to gain a better understanding of this framework, how it can be applied, and its usefulness and applicability to the analysis of the range of activities being undertaken by PAN members.

Current Study

I have been working with a framework designed to map or describe the role of information and communication technologies in development projects. This framework was developed by Sam Lanfranco at York University in Toronto, Canada [additional information on the framework can be obtained from Sam Lanfranco (lanfran@bellanet.org) and details about the framework are posted at http://www.yorku.ca/research/dkproj/meta4]. I conducted a preliminary study in March 1997 to look at how ICTs contribute to development projects and to test the applicability of this framework. Further research was undertaken in May 1997 to try to understand how ICTs have contributed to PAN and to assess the usefulness of the framework. Before describing the results of the survey, I will briefly describe this "ICT Audit Framework".

ICT Audit Framework

This framework was designed by Sam Lanfranco to help understand the areas where ICTs influence the behaviour of projects and the achievement of project objectives. It is designed to provide a framework for thinking about ICTs in projects and about ICT projects, and it can be used to assist to design an evaluation framework.

The framework is based on the idea that ICTs produce an electronic or virtual workspace that is being used increasingly to overcome some of the constraints imposed by traditional structures and workspaces. Because ICTs can store and process digital information (numbers, text, and audio and video) and also transmit or retrieve this digital information both quickly and at increasingly low cost, new types of organizations and interactions are evolving. The key factor in these interactions is that they allow enhanced collaboration across time and space.

In the survey I undertook of PAN, I used the framework to guide the development of the questionnaire. I was most interested in the projects themselves, but the framework can be applied at several levels — for example, at the level of the project itself, at the level of its component parts; and at the level of the project in relation to the PAN network. I use "project" in this description, but the entity being evaluated can just as easily be an organization, project, task, or individual. Traditional evaluations usually focus on treating projects as discrete units. Because ICTs can have a large impact on collaboration among network members, and because evaluation should take external effects into account, part of the analysis should look at the impact of ICTs on the network as a whole.

The ICT Audit Framework assumes that ICTs operate within and between four quadrants that characterize the activities of any project: administration; research and learning (for internal capacity building); products and services; and communications (within and beyond the entity).

ICTs allow people to undertake activities in each of these four quadrants and are considered to be of three types. Each of these types of ICT activity have comparable activities in the real or "literal" world. First, ICTs facilitate communication. Email often represents the core of a

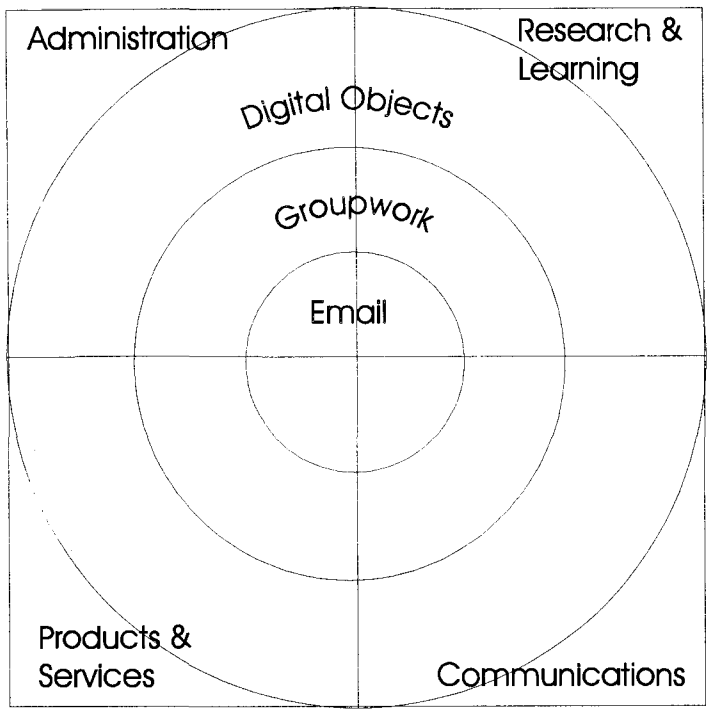

Figure 1. ICT Audit Framework.

project's electronic workspace. It links the component parts of the project and provides a link to the rest of the world. Traditionally in the workplace, this activity would include conversations and letter writing. Second, ICTs allow us to collaborate across time and space, either within the project or beyond. This workspace, called groupwork, is comparable to the interactions that take place in meetings, seminars, and conferences. Third, ICTs support the creation, use, and distribution as well as access to stored digital objects (e.g., files, databases, and audio and video objects). This is like a book on a library shelf that can be consulted as needed. The components of the ICT Audit Framework are shown in Figure 1.

In the framework, ICTs provide projects with three new capacities: (1) a virtual workspace within the entity (e.g., computers for word-processing and data analysis as well as local-area networks; (2) a communications corridor that allows projects to access remote sites; and (3) a communications corridor to allow remote sites to access products or services produced by the project. These three capacities, the local workspace, local access to remote workspaces, and remote access to local workspaces constitute the central focus of the framework.

The objective of the framework is to help organize relevant questions and to identify information and evidence. The four-quadrant approach aids evaluation because it focuses on how the entity operates within its virtual workspace, how its component parts relate to each other in that space, and how the entity relates, as a stakeholder, to other entities within a larger virtual workspace. By including ICT components in the evaluation process, the framework allows questions to be asked about the relationship between the project's activities within the electronic venue and in the real world.

Survey Results

This study of the PAN network was undertaken as part of a series of joint activities of the Evaluation Unit of IDRC and Bellanet to examine how Information and Communication Technologies (ICTs) are used within Centre-supported activities. It was a follow-up to an earlier study entitled *Use of Information and Communication Technologies in IDRC Projects: Lessons Learned.*

PAN was selected as the focus for this study following discussions with representatives of the Evaluation Unit, Bellanet, and IDRC program staff responsible for PAN. The network offered several advantages for this study. It included a number of organizations that were involved in complementary and collaborative work, the members were available by email to make an electronic survey possible, and PAN members were going to be meeting in Mongolia to review program plans, which would provide an opportunity for follow-up interviews and the presentation of results to participants.

This study was designed with the following objectives: to understand how ICTs are currently being used within the PAN network; and to test the usefulness of an ICT Audit Framework for mapping and describing these uses. In addition, the results of the study were to be used to stimulate discussion about the role of ICTs in future PAN activities and to contribute to the discussions at the Global Knowledge 97 Conference in Toronto in June.

Questionnaire and Interview Guide

Two instruments were developed to collect data for this study. The first was a questionnaire that was designed to be administered by electronic mail. This questionnaire was used to determine how ICTs were currently used within a sample of the PAN organizations that would be present at the Mongolia meeting. ICTs in this context were considered to be computer-mediated communications activities. Respondents were asked to provide information on how ICTs helped them accomplish their project work — specifically, how they communicated with others, how they administered their project, how they helped improve project performance, and how they helped in the delivery of products and services. Respondents were also asked to rank the relative importance of three common uses of ICTs in their work — to send and receive information and documents (e.g., e-mail), to collaborate with colleagues (e.g, electronic conferences), and to retrieve and distribute information (e.g, World Wide Web). Details on amount of use and examples or types of usage were also collected.

Prior to its use, this questionnaire was pretested by email on five individuals who use ICTs in their daily work and a focus group was held to discuss both the format and content of the questions and the suitability of the questionnaire for administration by email. Following this, the revised questionnaire was tested once more before being sent to a sample of 27 individuals associated with PAN. The sample included service providers, content providers, and IDRC and Bellanet staff associated with the PAN program. After the initial deadline for replies passed, a follow-up reminder email was sent to encourage responses.

The interview guide was designed to clarify information collected during the email survey and to help collect information about the complete communication environment in which the PAN participants worked. It was also pretested. It will be used during the PAN Mongolia conference to interview those individuals who completed the email questionnaire.

Analysis

A total of 27 questionnaires were sent by email to both PAN participants and to IDRC and Bellanet staff. Of the 20 questionnaires sent to PAN participants, 15 completed questionnaires were received (a response rate of 75%). The response rate from IDRC/Bellanet staff was 2 of 7 (28%). Those who replied to the survey were asked to indicate the roles that they played within

PAN. They were asked to indicate in what capacity they were answering the questions and were encouraged to indicate more than one choice if appropriate. More than half of the replies were from content providers (10) — the other respondents were PAN project managers (6); service providers (4); IDRC staff (2); and others (2). Given the small sample size, it was not feasible to examine the data separately. The replies have been grouped for analysis.

Table 1 indicates the extent to which ICTs were felt to have helped with specific project-related tasks. Given the nature of this group of projects it is not surprising to find that as a whole they make rather broad use of ICTs. The most frequent role played by ICTs is in communication with colleagues.

The respondents who are indicated to have replied "not applicable", did not yet have access or had just recently acquired access and could not assess the role ICTs might have. Where ICTs were not yet available (3 of 15 replies), respondents continued to rely on regular mail, telex, facsimile, cables, site visits, and direct one-on-one conversations.

Changes in the Workplace

The questionnaire was designed to determine the extent to which email, group work, and access to the WWW had helped in the accomplishment of specific types of project activities. We were specifically interested in the contributions that had been made to administration, communication, research and learning, and products and services within project activities. This information was used to map the activities of the respondents to the ICT Audit Framework that had been developed by Sam Lanfranco. During our discussions in Mongolia, I hope to determine from the participants how accurate a picture the framework presents of their activities and to obtain their input into modifications that might make the framework more applicable to their situations.

Table 1. Extent to which ICTs were reported to have helped accomplish various tasks (N=15).

Communicate with others	Not at all	0
	A little	0
	A lot	**14**
	N/A	1
Administer project	Not at all	0
	A little	5
	A lot	**8**
	N/A	2
Collect, analyze, use information to improve project performance	Not at all	1
	A little	6
	A lot	**7**
	N/A	1
Develop and deliver products and services	Not at all	1
	A little	4
	A lot	**8**
	N/A	2

Which uses are most important?

Respondents were asked to rank the importance of different uses of ICTs to their organizations. An overwhelming majority (13 of 15) ranked the ability to communicate with others as the most important use of ICTs. The ability to retrieve or distribute information was ranked second by 9 of 15, and the ability to collaborate with colleagues through such things as electronic conferences was ranked third by 10 of the 15 respondents.

The replies can be summarized by the reply given by one respondent: *e-mail and digital objects are the common benefits we receive. We are not that familiar yet with collaborating with colleagues through electronic conferences.* There is interest in greater use of conferencing, as well as an appreciation of its potential benefit, but for now it is not yet used. The plan to have an on-going electronic conference during the workshop should help to provide both examples of the benefits that can be derived as well as first-hand experience with what is required to establish and

mediate such a conference. Listservs were cited as the most common way for groups to work collaboratively on activities. A summary of the replies are given in Table 2.

Electronic Mail

The responses from those who have access to ICTs reflect the changes that are taking place in the workspace. In addition to citing the ways in which they are using ICTs, respondents also indicated the benefits that they derived from these technologies. By far the greatest change in the projects was the replacement of regular mail and telephone and facsimile by electronic mail for regular communication. A sample of the comments includes:

- *I work with global networks, my work would be impossible, or too expensive, if I were to rely on phones and faxes.*
- *We use email a lot for discussing project proposals and for report writing with our partners and sponsors.*
- *Communication has improved and become much more simple and cheaper with the use of ICTs.*

Email was favored by the respondents because it provided a cost-effective, speedy, and easy way to improve their access to a global community of associates, clients, colleagues, and experts. Some of the comments reflect the benefits that are derived:

- *The low cost of communication using email should be recognized.*
- *Email in particular allows us to communicate with our members in 9 Asian countries faster and cheaper.*
- *Email is used in more than 95% of the correspondence with fax second. Mail is not used anymore for communication.*
- *We rely heavily on Internet email to communicate with our associates and correspondents, especially where the Internet activity is widespread ... our reliance on the Internet is increasing by the day.*

Table 2. Summary of how email, digital objects, and group work have helped project activities (values expressed in percentage, N is number of respondents).*

		Email (N=13)	Groupwork (N=12)	Digital Objects (N=40)
Communicate with others	Not at all	0	25	10
	A little	0	17	30
	A lot	92	25	38
	N/A	8	33	23
Administer project	Not at all	15	33	20
	A little	23	17	35
	A lot	54	17	23
	N/A	8	33	23
Collect, analyze, use information to improve project performance	Not at all	0	42	10
	A little	54	0	25
	A lot	38	25	43
	N/A	8	33	23
Develop and deliver products and services	Not at all	8	33	13
	A little	46	17	33
	A lot	31	17	28
	N/A	15	33	28

* Number of non-respondents not shown.

ICTs are used extensively for project administration. Email, once again, is now being commonly used to help with coordination, planning, monitoring, data collection and analysis, and comparative evaluations. These uses of ICTs allow for timely administration of activities and are viewed as indispensable to those who are using them:

- *It is really not possible to imagine administering projects without the use of ICT tools.*

- *E-mail and listservs are indispensable when working with international committees on publications.*
- *We use e-mail a lot in planning our projects.*
- *Through e-mails, we can communicate with our colleagues in other projects and in other countries to collaborate and exchange information ... we can surely reach them fast and easy.*

ICTs also play an important role in helping organizations to collect, analyze, and/or use information to improve project performance. ICTs are used to facilitate decision-making, to seek information and research findings that are pertinent to on-going activities, to review planned methodologies, and to monitor changes in the external environment (e.g., price fluctuations and trade statistics). Respondents' comments included:

- *Collect information ... to monitor prices and other trade statistics.*
- *Since we have access to the Internet, we have access to various (types of) information that is available on-line and can help us in our research work.*

WWW Access

Three questions were asked to try to understand how producing or using various types of "digital objects" had aided project performance. This was done to try to separate the WWW from the use of other products such as databases, image banks, Geographic Information Services, and CD-ROMs. However, when the responses were reviewed, they indicated that the WWW was used as the means of access to the examples that were cited. For this reason, the data were combined for analysis.

This aspect of ICTs is clearly one that will be used on an increasing basis as more of the PAN partners acquire full Internet access — something that several indicated was either planned or had just happened:

- *We are only just setting up an Internet service. Hence we have not used it yet.*
- *The use of digital information has not been widespread in our institution ... only very recently have we acquired the hardware required for the use of such information.*

Those who do have access to the Internet use it both to collect information and to contribute to databases:

- *The WWW is mainly used to find information, find email addresses of institutions, people, info about institutions, about countries, etc.*
- *Browsing different web sites I can collect development information and can analyze and improve my project performance.*
- *We are contributing information to the Asian Health, Environment, and Allied Databases.*
- *We are in the process of developing our data base on coconut information using CDS/ISIS software.*

Some respondent noted the potential of WWW access but pointed out constraints that will have to be overcome by some institutions:

- *The telephone lines are not good enough and browsing WWW is very costly.*
- *We work in our 13 member countries through designated link institutions and contact ministries. Our programs and projects are, in most cases, implemented in collaboration with these institutions. A constraint that we have in using ICTs is that most of these institutions do not have access to Internet or email.*

Although construction of a Web site is something that is in the future for several institutions, some respondents have been able to improve their access to the electronic world and reported that they had established a WWW presence and were using homepages to disseminate project-related information to their main stakeholders. New products and services are being developed and delivered. ICTs are used to format documents for formal publishing and they are used to seek information and confirm sources. Web pages are also increasingly used to advertise the availability of material (e.g., publications and training programs) and to make information available to a wider audience through "web publishing". For example:

- *(We are) using the WWW to disseminate research results — e.g., PAN web site.*
- *In addition to our printed list of publications, we use our site to deliver our publications to interested parties.*

- *We have used our homepage to display bibliographic information on all of our publications and we plan to publish (in full text) our semi-annual journal to our web site.*
- *Since (our) homepage was placed on-line two years ago, we have put a step forward in making available the project's objectives and findings ... not only locally but to the international community as well.*
- *Through our homepage, we can make available to our clients some of the developments of the projects and other vital information that would help them to administer their research and vise versa. In the future, we are planning to make available all of our research papers and project updates in our homepage.*

Group Work

Group work for the organizations that are now involved basically means the use of listservs. This is an area that has not been explored to any great extent by the respondents, partly because they lack the know-how; however, they expressed interest in exploring this form of collaboration. Some comments express their situations:

- *We subscribe to several listservs that are related to our field of interest like, energy, agriculture, water, and sanitation. This keeps us updated on these topics.*
- *We have not participated in electronic conferencing yet. However, we are interested in electronic conferencing.*
- *We don't have the capabilities yet or know-how to do or make electronic conferences.*
- *We have three branch offices in the city. Networking is the main tool for monitoring our everyday tasks.*

Conclusions

Within the PAN group of projects, ICTs are very much a part of the activities of the respondents. Although their level of access to such advanced ICT usages as the WWW is limited in some cases, all indicate that email has changed the way in which they communicate and seek and share information. Those who have Web access are using these capabilities to both gather information from remote sites and make information available to their partners as well as the broader global

community. There is a desire to make greater use of these WWW capabilities as soon as full Internet access is achieved. Although not currently used to a great extent, group work was recognized as something that could contribute to planning and the successful conduct of project activities. As greater skill and training are acquired in electronic conferencing these aspects are likely to grow in importance in PAN's activities.

ICT Audit Framework

The audit framework that was developed by Sam Lanfranco was used to help formulate the questions that were asked in the questionnaire. As such, the framework guided our thinking about the aspects of the work environment that could be impacted by ICTs and also helped us think about the categories of ICTs that should be examined. This helped us ensure that we were covering a broad range of topics. As a result, we have been able to group the ICT activities according to the quadrants and domains of the framework. These are shown in Figure 2.

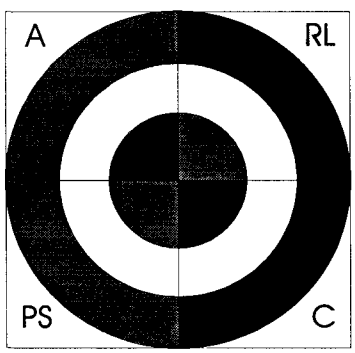

Figure 2. ICT Audit Framework.

C = communication; PS = products and services; RL = research and learning; and A = administration. Centre circle represents email, second group work, and outside circle digital objects. White areas represent little or no usage; gray represents some usage; and black represents heavy usage.

It is our plan during the workshop to interview the people who replied to the questionnaire to develop a more complete understanding of the non-ICT communications methods that they employ and of the interrelationships that exist between the ICT and non-ICT methods. As well, we hope to use the conference as a forum that will allow us to gather information on the types of ICTs that are being used and to seek to have the participants group these ICTs into meaningful collections (domains). We will also ask the participants to break down the tasks that they accomplish using ICTs and also to group these (quadrants). The intention is to seek how the ICT

audit framework reflects the real-life experiences and thinking of the PAN participants. This information will be used to help modify the framework (if necessary) and will also be used as input into the Global Knowledge 97 Conference.